

इंटरनेट

मानक

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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 15418 (2003): Wall Coverings in Roll form for Finished Wall Papers, Wall Vinyls and Plastic Wall Coverings - [CED 5: Flooring, Wall Finishing and Roofing]



“ज्ञान से एक नये भारत का निर्माण”

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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

रोल किये जा सकने वाले दीवार पर कागज
विनाइल और प्लास्टिक आवरण – विशिष्टि

Indian Standard

WALL COVERINGS IN ROLL FORM FOR
FINISHED WALL PAPERS, WALL VINYLs AND
PLASTIC WALL COVERINGS — SPECIFICATION

ICS 91.180

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

Wall coverings made of paper/wall vinyl and plaster are used in houses as well as in commercial buildings. This standard intends to give a uniform requirements for dimension, grade, colour fastness, spongeability application to the above types of wall coverings.

In the formulation of this standard, considerable assistance has been derived from EN 233 : 1989 'Wall coverings in roll form — Specification for finished wall coverings'.

The composition of the Committee responsible for formulation of this standard is given at Annex F.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off values should be the same as that of the specified value in this standard.

Indian Standard

WALL COVERINGS IN ROLL FORM FOR FINISHED WALL PAPERS, WALL VINYLs AND PLASTIC WALL COVERINGS — SPECIFICATION

1 SCOPE

1.1 This standard covers the following:

- a) It specifies requirements for dimensions, minimum spongeability and grade of washability and colour fastness to light.
- b) It gives the symbols, to be used for marking purpose, for these characteristics and also for matching, methods of application and removal.
- c) It specifies requirements for marking.
- d) It gives the designation system.

1.2 The marking requirements of this standard are primarily for information of the consumer and to enable optimum use to be made of the product.

1.3 This standard applies to finished wall paper, wall vinyl and plastics wall covering supplied in rolls for hanging on to walls and ceilings by means of an adhesive covering the whole of the interface between the wall covering and the support and those are not intended to be decorated after hanging.

1.4 Excluded from this standard are rigid materials, materials not attached or not wholly attached by adhesive, wall coverings for subsequent decoration, textile wall coverings, heavy duty wall coverings and non-decorative wall coverings such as wall linings or those with special properties, for example, thermal or acoustic insulation.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated below:

<i>IS No.</i>	<i>Title</i>
2454:1985	Methods for determination of fastness of textile materials to artificial light (Xenon lamp) (<i>first revision</i>)
7888:1976	Methods of test for flexible polyurethane foam

IS No.

Title

15401:2003 Wall covering in roll form —
Vocabulary and systems

3 DEFINITIONS

The definitions given in IS 15401 shall apply.

4 DIMENSIONS

4.1 General

4.1.1 The area of the roll shall be $5.326 \text{ m}^2 \pm 3$ percent.

4.1.2 The nominal width and length shall be declared; the permitted deviation from the declared values shall be not more than 1.5 percent.

4.1.3 The nominal width shall be not less than 500 mm and not greater than 530 mm.

4.1.4 Sampling for testing shall be in accordance with Annex A.

4.2 Method of Measuring Dimensions

4.2.1 Dimensions shall be measured in accordance with Annex B.

4.2.2 The edges of a roll shall be straight and parallel to its entire length, over to the following extent:

- a) *Straightness* — Over any 1 m length the edges shall not deviate more than 1 mm from straight.
- b) *Parallelity* — The three width measurements taken in accordance with B-3(a) shall not differ by more than 1 mm.

5 SPONGEABILITY

For a wall covering to comply with this standard it shall be possible to wipe off the hanging adhesive whilst it is still damp from the front face of the wall covering with a damp cloth or sponge without causing visible damage.

Accordingly the wall covering, when tested in accordance with Annex C for spongeability, shall exhibit no damage or change, comparison with the reference piece, that would detract from appearance as a wall covering on a wall.

The symbol to be used to indicate this degree of spongeability is shown in Table 1, SI No.1.1.

Table 1 Symbols for Marking Purposes
(Clause 5)



















Category and SI No.	Description	Symbols	Designation Character
1 Spongeability			
1.1	Spongeable at time of hanging		A
2 Washability			
2.1	Washable		B
2.2	Extra-washable		C
2.3	Scrubbable		D
3 Colour Fastness to Light			
3.1	Moderate		3
3.2	Good		5
4 Pattern Matching			
4.1	Free match		
4.2	Straight match	 (with, added, the dimensions of designs repeat in cm, for example 50)	
4.3	Offset match	 (with, added, the dimension of design repeat and distance offset in cm, for example 50/25)	
4.4	Reverse alternative lengths		

Table 1 (Continued)

Category and SI No.	Description	Symbols	Designation Character	
5 Means of Application¹⁾				
5.1	Adhesive to be applied to the wall covering		G	J
5.2	Adhesive to be applied to the support to be decorated		H	
5.3	Prepasted (Ready pasted)		K	
6 Method of Removal				
6.1	Strippable		1	
6.2	Peelable		2	
6.3	Wet removable		3	
7 Miscellaneous				
7.1	Overlap and double cut			
7.2	Duplex embossed			

¹⁾Where symbols in this category require to be used in combination, for example, 5.1 and 5.2, the necessary symbols shall be given as shown, separated by a + sign of equivalent size to these symbols.

6 WASHABILITY

6.1 If the wall covering is claimed to be washable during life after hanging, according to its grade of washability, it shall be termed washable, extra-washable or scrubbable.

6.2 When tested in accordance with Annex C, according to its grade of washability, the wall covering shall exhibit no visible damage or change, in comparison with the reference piece, that would detract from its appearance as a wall covering on a wall.

6.3 The symbols to be used for indicating the grade of washability shall be as shown in Table 1, SI No. 2.1 to 2.3.

6.4 A wall covering unable to meet the minimum grade of washability as specified shall not be termed washable. It shall not carry a washability symbol.

7 COLOUR FASTNESS TO LIGHT

7.1 Two grades of colour fastness to this standard are recognized:

- a) Moderate; numerical rating not less than 3; and
- b) Good; numerical rating not less than 5.

7.2 The numerical rating for colour fastness to light shall be determined in accordance with Annex D. A wall covering to standard shall not have a rating of less than 3.

7.3 The symbols to be used for indicating the grade of colour fastness to light shall be as shown in Table 1, SI No. 3.1 and 3.3.

8 MATCHING, APPLICATION, REMOVAL AND MISCELLANEOUS SYMBOLS

8.1 The symbols to be used for indicating pattern matching shall be as given in Table 1, SI No. 4.1 to 4.4.

8.2 The symbols to be used for indicating the means of application shall be as given in Table 1 SI No. 5.1 to 5.3.

8.3 The symbols to be used for indicating the method of removal are given in Table 1, SI No. 6.1 to 6.3.

8.4 The symbols to be used for indicating the desirability of overlapping joins and double cutting, and for a duplex embossed wall covering shall be as given in Table 1, SI No. 7.1 and 7.2 respectively.

9 MARKING

9.1 Visible Markings

When compliance with this standard is claimed, the roll, outer wrapper or a separate label inside the wrapper of a roll of wall covering shall state the special characteristics of the wall covering in such a way that the following information is readily visible to the purchaser without removing any outer wrapper from an individual roll:

- a) Number of this standard,
- b) Name or identification mark or manufacturer, supplier or distributor,

- c) Product description,
- d) Identification of product, that is, pattern number, batch number,
- e) The width, length and area of the roll,
- f) For a washable wall covering, its washability grade, that is, whether washable, extra-washable or scrubbable, using the appropriate symbol from category 2 of Table 1,
- g) The grade of colour fastness to light, that is, whether moderate or good, using the appropriate symbol from category 3 of Table 1,
- h) The means of application, using the appropriate symbol(s) from category 5 of Table 1, and
- j) The need to reverse alternate lengths, if this is an essential requirement for satisfactory appearance, using the symbol 4.4 from category 4 of Table 1.

9.2 Additional Markings

If necessary, the following information shall be given on roll, on a label or on an information sheet enclosed with the roll:

- a) That the wall covering is spongeable at the time of hanging, using the symbol 1.1 from category 1 of Table 1;
- b) Additional hanging instruction, for example, overlap and double cut, using the symbol 7.1 from category 7 of Table 1;
- c) Type of adhesive to be used;
- d) Design repeat and match, using the appropriate symbol from category 4 of Table 1;
- e) Method of removal, using the appropriate symbol from category 6 of Table 1; and
- f) Whether the wall covering is duplex embossed, using the symbol 7.2 from category 7 of Table 1.

9.3 Consistency of Marking

The information given in promotional literature, in the pattern book, marked on the pattern slip and marked on cartons shall be consistent with the information given with the roll as defined in 9.1 and 9.2.

9.4 Designation

If a designation system is used for the wall coverings covered by this standard, it shall be in accordance with Annex E.

ANNEX A
(Clause 4.1.4)

SAMPLING FOR TESTING

A-1 OBLIGATORY

A-1.1 Samples for testing shall be taken from wall coverings, not less than 14 days after manufacture, in accordance with the following except that:

<i>No. of Sheets in the Lot</i>	<i>Minimum No. of Sheets to be Taken from the Lot</i>
< 1 000	10
1 000 to 5 000	15
> 5 000	20

a) Rolls selected for samples may be chosen at

random or, if the manufacturer in marking indicates the order of packing from the making, the selection may be made with reference to the order of packing; and

b) Method of cutting sheets shall be modified so that each specimen shall commence at least 1 m from the end of the roll and shall extend across the whole width of the roll; it shall extend not less than 500 mm along the length of the roll.

A-1.2 The total area of material taken from each roll shall be twice the area of the pieces required for testing to carryout repeat tests without re-sampling.

ANNEX B

(Clauses 4.2.1 and 4.2.2)

METHOD OF MEASURING DIMENSIONS

B-1 INSTRUMENT

A suitable steel rule calibrated, in mm, and accurate to ± 0.5 mm.

B-2 PREPARATION

Measurements shall be made on rolls selected for sampling in accordance with 4.1.4 and conditioned in accordance with the following procedure:

The samples may be conditioned in a chamber or test room maintained at 27 ± 1 °C and 65 ± 2 percent relative humidity. They shall be held in such way that the conditioning air has free access to all the surfaces so that their moisture content attains a state of equilibrium with the water vapour in the atmosphere. This equilibrium is considered

to be attained when the results of two consecutive weighings at least 1 h apart do not differ by more than 0.25 percent of the total mass.

NOTE — With good air circulation, a conditioning period of 4 to 6 h is sufficient.

B-3 PROCEDURE

a) **Width** — Measure the width perpendicular to the length of the roll at least at three points on the roll which are at least 1 m apart. State the width as the arithmetic mean of these measurements to the nearest mm.

b) **Length** — Measure the length on one side of the roll after ensuring that the roll ends are cut at right angles. State the length to the nearest mm.

ANNEX C

(Clauses 5 and 6.2)

METHOD OF TEST FOR SPONGEABILITY AND FOR WASHABILITY

C-1 PRINCIPLES

A test piece cut from the wall covering is secured on a horizontal surface and after the application of a reagent, is mechanically rubbed. The test piece is then examined for damage.

C-2 MATERIALS

The following materials are used:

- a) *For Spongeability* — Distilled or de-ionized water at $27 \pm 1^\circ\text{C}$.
- b) *For Washable and Extra-Washable Wall Coverings* — A 2 percent (mass/mass) solution of soft soap in distilled or de-ionized water at $27 \pm 1^\circ\text{C}$.

The soap shall be made by the reaction of potassium or sodium hydroxide with a suitable vegetable oil or oils, or with fatty acids derived therefrom, that yields not less than 44 percent of fatty acids. The soap shall be jelly like in texture.

- c) *For Scrubbable Wall Coverings* —
 - 1) White aluminium oxide abrasive powder with nominal particle sizing as given below:

Nominal Aperture μm	Particle Sizing, Percent by Mass, Retained
125	Nil
90	0 to 15
63	40, Min
53	65, Min
 - 2) Mix 75:25 (mass/mass) with a soap solution conforming to (b) at $27 \pm 1^\circ\text{C}$.

C-3 APPARATUS

C-3.1 Base Machine (see Fig. 1)

The base machine shall include the following characteristics:

- a) A flat glass platen mounted in the horizontal plane with a framework for clamping on a 300 mm long \times 150 mm wide test piece of wall covering, retaining the reagent placed on the test piece and preventing the ingress of reagent under the test piece.
- b) A motor driven arm to which a rubbing head, with its bottom face resting on the platen, is

pivoted. The machine has an automatic stop mechanism which can be pre-set to stop the arm on completion of the required number of cycles.

- c) The arm reciprocates the rubbing head on a straight course along the length of the test piece with sinusoidal displacement against time. The length of its stroke is 1.490 mm and it can be set to reciprocate at two speeds 30 ± 3 cycles/min and 120 ± 10 cycles/min.
- d) The rubbing head is attached to the arm by it parallelogram linkage to allow free vertical movement of the head whilst maintaining its working surface in a horizontal plane. There is negligible play or friction between the head and the arm.

C-3.2 Rubbing Heads

The following rubbing heads are required:

- a) *For Spongeability* — A head with a bottom face 50 mm long and 29 mm wide to which a sponge is secured by end clamps. The total mass of the head with sponge attached which bears on the piece is $100 \text{ g} \pm 5 \text{ g}$.

The sponge is cut from polyether foam open cell irregular structure sheet of apparent density $22 \pm 1 \text{ kg/m}^3$ of hardness $20.5 \pm 2.5 \text{ N}$ when measured in accordance with IS 7888 in an atmosphere of $27 \pm 1^\circ\text{C}$ and 65 ± 5 percent relative humidity and of thickness $6.2 \pm 3.2 \text{ mm}$ measured in accordance with IS 7888. The sponge is $29 \pm 1 \text{ mm}$ wide and of length sufficient to be laid along the 50 mm length of the bottom face of the head and secured by the clamps.

- b) *For Washable and Extra-Washable Wall Coverings* — A head with a bottom face 50 mm long and 29 mm wide to which a strip of felt is secured by end clamps. The total mass of the head with felt attached which bears the test piece is $550 \pm 10 \text{ g}$.

The strip of felt is cut from white packaging felt sheet with a composition of at least 97 percent wool fibre quality 60's, a density of $0.181 \text{ g/cm}^3 \pm 15$ percent a thickness of $6 \text{ mm} \pm 20$ percent and the following chemical grade of purity:

- 1) pH value of aqueous extract 5 to 8.0;
- 2) chloride content, calculated as NaCl, 0.05 percent, Max;

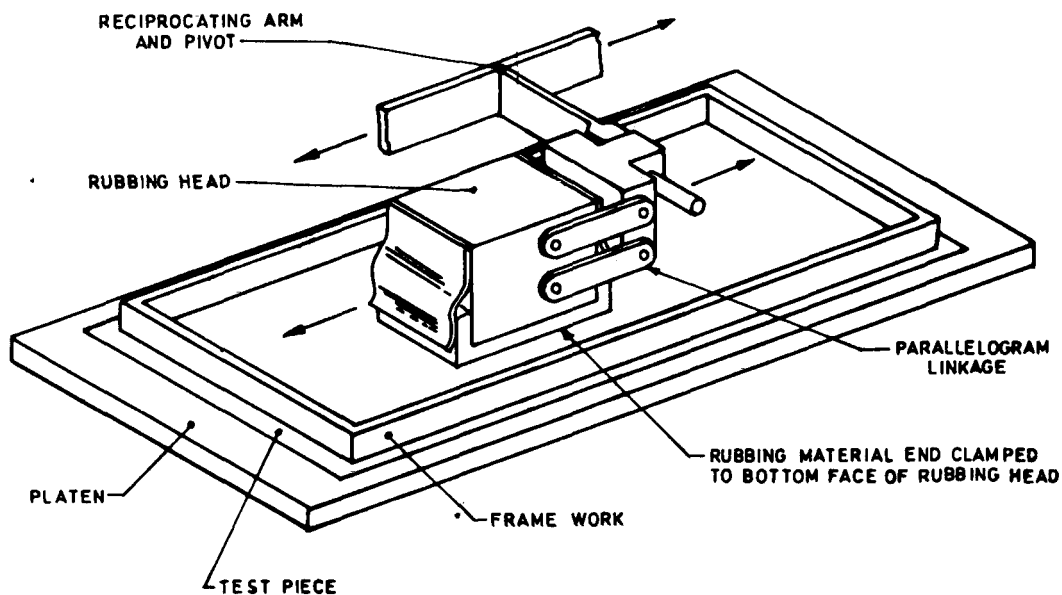


FIG. 1 DIAGRAM ILLUSTRATING THE MECHANISM OF THE SPONGEABILITY AND WASHABILITY TEST APPARATUS

- 3) sulphate content, calculated as Na_2SO_4 , 0.25 percent, *Max*;
- 4) amount of matter soluble in toluene/methanol (other than matter derived from proofing agents) 5.0 percent, *Max*;
- 5) amount of matter soluble in water after removal of matter soluble in toluene/methanol 3.0 percent, *Max*; and
- 6) ash (other than the ash of proofing agents) 3.5 percent, *Max*.

The strip is 29 ± 1 mm wide and of length sufficient to be laid along the 50 mm length of the bottom face of the head and secured by the clamps.

- c) *For Scrubbable Wall Coverings* — A head with a brush secured to its bottom face. The total mass of the head with the brush attached which bears on the test piece is 600 ± 10 g. The brush diameter bristles has nylon 6.6 bristles 0.35 ± 0.025 mm in diameter arranged in 56 tufts each of 21 bristles ± 2 bristles, 11 ± 1 mm long as detailed in Fig. 2.

NOTE — When not in use the brush should be stood with bristles upwards to prevent premature bending of the bristles.

C-4 TEST PIECES

From a roll selected for sampling in accordance with Annex A, cut three test pieces and a reference piece each $300 \text{ mm} \times 150 \text{ mm}$ using a template so that the long sides lie parallel to the width of the roll and such that all colours in the pattern are included.

C-5 PROCEDURE

Maintain the atmosphere of the test room at $27 \pm 1^\circ \text{C}$ and 65 ± 5 percent relative humidity, and the following:

- a) *For Spongeability* — Use a rubbing head conforming to C-3.2 (a). Ensure that the sponge shows no signs of damage or any other defect liable to cause a typical wear such as pores clogged by pigment, paper fibres, etc.

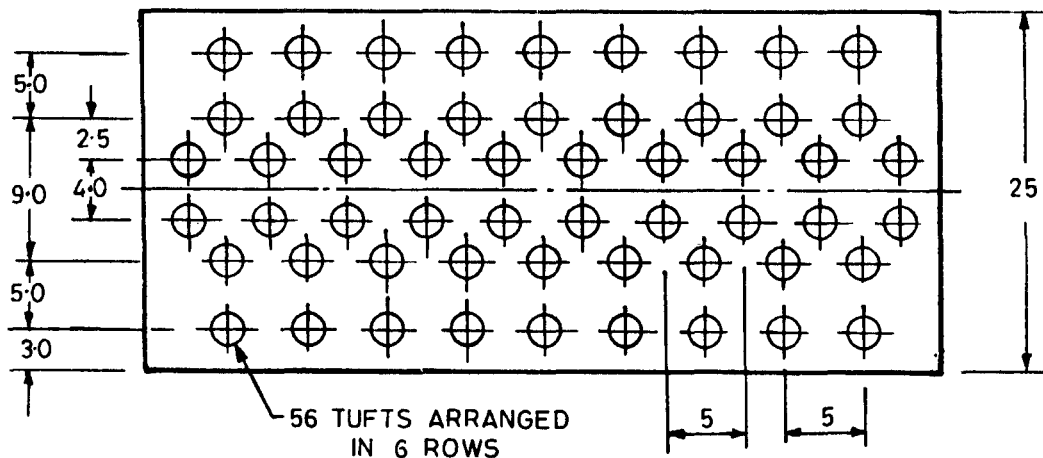
Set the machine to operate at 30 ± 3 cycles/min and to stop when 20 cycles have been completed.

Clamp a test piece to the platen. Pour 30 ml of water conforming to C-2 (a) on to the piece and 10s later lower the rubbing head into position and immediately start the machine. On completion of the cycles, remove the test piece from the platen and dry the piece.

NOTE — A suitable method of drying is 4 min in a laboratory oven at $105 \pm 1^\circ \text{C}$.

Repeat this 5 procedure on the other two pieces. Examine them in accordance with C-6.

- b) *For Washable Wall Coverings* — Use a rubbing head conforming to B-3.2 (b). Ensure that the felt has not previously been used for more than 8 h of actual rubbing and shows no loss of pile. Soak the strip in water for 15 min. Set the machine to operate at 120 ± 10 cycles/min and to stop when 30 cycles have been completed.



All dimensions in millimetres.

FIG. 2 PLAN VIEW OF ARRANGEMENT OF TUFTS IN BRUSH

Clamp a test piece to the platen. In rapid succession pour 30 ml of soap solution conforming to C-2 (b) on to the test piece, lower the rubbing head into position and immediately start the machine.

On completion of the cycles, remove the test piece from the platen and rinse the piece.

Repeat this procedure on the other two test pieces.

Examine the test pieces whilst still wet for visible signs of damage. Dry the test pieces [see Note of C-5 (a)] and re-examine them in accordance with C-6.

NOTE — When examined wet, any break in the water resistant coating will be easily visible since in these areas the base paper will be wetted and therefore discoloured. After drying these breaks may not be apparent. This wet examination is required because wall coverings meeting this test are often used in bathrooms where high humidity prevails.

- c) *For Extra-Washable Wall Coverings* — Carry out the procedure given in C-5 (b) except set the machine to stop when 100 cycles have been completed.
- d) *For Scrubbable Wall Coverings* — Use a rubbing head conforming to C-3.2 (c). Ensure that the brush bristles are not bent.
- Set the machine to operate at 30 ± 3 cycles/min and to stop when 40 cycles have been completed.

Clamp a test piece to the platen. Spread 5 g

of abrasive paste conforming to C-2 (c) over the area of test piece to be scrubbed and pour 20 ml of soap solution conforming to C-2 (b) on to the test piece. Lower the rubbing head into position and immediately start the machine.

On completion of the cycles, remove the test piece from the platen and rinse and dry the piece [see Note to C-5 (a)].

Repeat this procedure on the other two test. Examine the test pieces in accordance with C-6.

C-6 ASSESSMENT

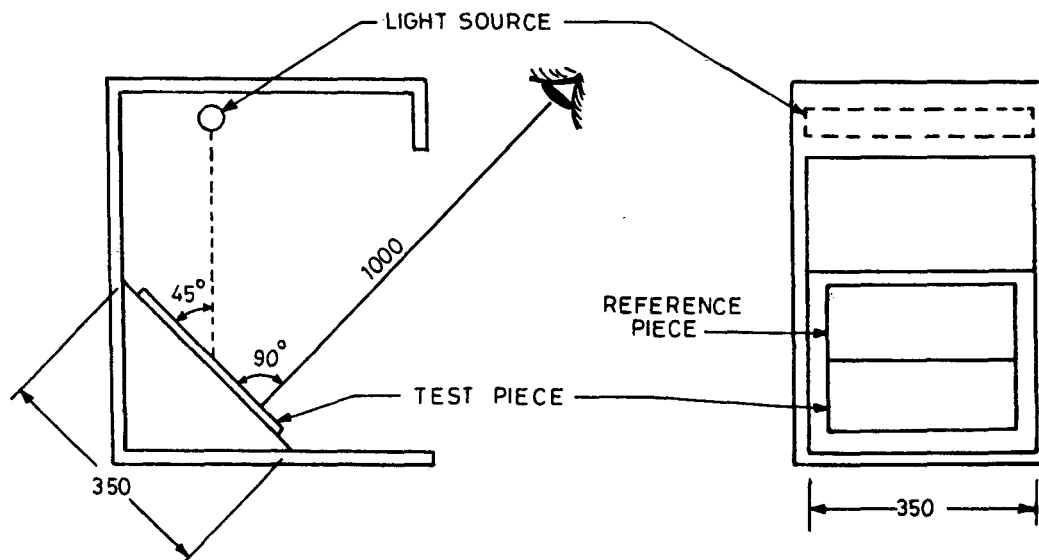
Compare each test piece, tested in accordance with C-5, with the reference pieces in a viewing cabinet as illustrated in Fig. 3.

The cabinet is painted internally matt neutral grey and is illuminated by a 6 500 k daylight lamp. The level of illumination at the base of the cabinet is between 750 lux and 1 500 lux.

View from a distance of 1 m.

C-7 EXPRESSION OF RESULTS

A wall covering satisfies the appropriate cleanability requirement if the test piece exhibits no visible damage or change resulting from the corresponding test of C-5, in comparison with the reference piece, that would detract from its appearance as a wall covering on a wall.



All dimensions in millimetres.

FIG. 3 VIEWING CABINET

ANNEX D

(Clause 7.2)

METHOD FOR THE DETERMINATION OF COLOUR FASTNESS TO LIGHT

D-1 Colour fastness to light is tested by exposing test pieces from a sample taken in accordance with 4.1.4 to artificial light under controlled conditions and assessing the result of exposure according to the method given in IS 2454.

The test pieces shall include all colours in the pattern.

The method of test shall be in accordance with IS 2454. Colour fastness to light; Xenon arc, using indoor filters and a relative humidity of 60 percent to 70 percent at a black panel temperature of 45°C, *Max*.

ANNEX E

(Clause 9.4)

DESIGNATION

E-1 DESCRIPTION

The designation consists of an optional explanatory keyboard block and a mandatory identification block consisting of the Indian Standard number block and individual item blocks as follows:

Wall Covering IS 15418 — 1) 1) × 2) 2) 2) 3) 4) 5) 6)

NOTES

- 1 Width boxes (2 off) :
Insert numerals giving roll width to the nearest cm.
- 2 Length boxes (4 off) :
Insert numerals giving roll length to the nearest cm.

3 Cleanability box:

Insert the appropriate letter from Table 1.

4 Colour fastness to light box:

Insert the appropriate number from Table 1.

5 Application box:

Insert the appropriate letter from Table 1.

6 Removal box:

Insert the appropriate number from Table 1.

E-2 EXAMPLE

A roll of finished wall covering of width 0.53 m and length 10.05 m, scrubbable, of good colour fastness to light, prepasted and peelable is designated as:

Wall Covering IS 15418 — 53 × 1005 D5 K2

ANNEX F

(Foreword)

COMMITTEE COMPOSITION

Flooring, Wall Finishing and Roofing Sectional Committee, CED 5

<i>Organization</i>	<i>Representative(s)</i>
In personal capacity (A-39/8, DDA Flats, Munirka, New Delhi)	SHRI P. B. VIJAY (<i>Chairman</i>)
All India Bricks and Tile Manufacturer Federation, New Delhi	SHRI S. P. BANSAL
Bhor Industries Ltd, Mumbai	SHRI K. L. SHAH SHRI R. K. PATEL (<i>Alternate</i>)
Builder's Association of India, Mumbai	SHRI B. S. BINDRA SHRI PAWAN TALWAR (<i>Alternate</i>)
Building Materials and Technology Promotion Council, New Delhi	SHRI J. SENGUPTA
CEAT Ltd, Hyderabad	SHRI S. SUNDRAM SHRI RAJENDER PAL (<i>Alternate</i>)
Central Building Research Institute, Roorkee	SHRI LATHIKA JAISINGH SHRI S. K. MITTAL (<i>Alternate</i>)
Central Public Works Department, New Delhi Engineer-in-Chief's Branch, New Delhi	CHIEF ENGINEER (CSR) SHRIMATI UPINDER KAUR SHRIMATI RIVOO MAHINDRU (<i>Alternate</i>)
Hindustan Zinc Ltd, Udaipur	SHRI C. S. MEHTA
India Meteorological Department, New Delhi	SHRI A. V. R. K. RAO SHRI S. C. GOYAL (<i>Alternate</i>)
Indian Institute of Technology, Kharagpur	MS RAJNI AHUJA
Institution of Engineers (India) Ltd, Kolkata	SHRI P. B. VIJAY
Maharashtra Engineering Research Institute, Nashik	CHIEF ENGINEER AND DIRECTOR SCIENTIFIC RESEARCH OFFICER (<i>Alternate</i>)
Ministry of Railways (RDSO), Lucknow	EXECUTIVE ENGINEER (P & D-II) EXECUTIVE ENGINEER (P & D-I) (<i>Alternate</i>)
Modern Tiles and Marble, New Delhi	SHRI A. C. KAPOOR SHRI SUBHASH KAPOOR (<i>Alternate</i>)
National Test House, Kolkata	SHRI D. K. KANUNGO SHRI R. KAPOOR (<i>Alternate</i>)
Prodorite Anti-Corrosives Ltd, Chennai	SHRI M. ANNAMALAI DR P. SACHINDRAPAL (<i>Alternate</i>)
Projects and Development India Ltd, Sindri	DR P. K. JAISWAL SHRI A. K. PAL (<i>Alternate</i>)
Public Works Department, Chennai	SUPERINTENDING ENGINEER (P & D) EXECUTIVE ENGINEER (<i>Alternate</i>)
Rashtriya Pariyojna Nirman Nigam Ltd, New Delhi	SHRI R. C. KEHRAM SHRI B. B. KANWAR (<i>Alternate</i>)

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<i>Organization</i>	<i>Representative(s)</i>
Steel Authority of India Ltd, Ranchi	SHRI S. SAH SHRI RAVICHANDRAM (<i>Alternate</i>)
STP Limited, Kolkata	SHRI T. K. ROY SHRI B. B. BANERJEE (<i>Alternate</i>)
In personal capacity [C-474B, Sushant Lok, Phase-I, Gurgaon-122002 (Haryana)]	SHRI O. P. RATRA
Director General, BIS	SHRI S. K. JAIN, Director and Head (CED) [Representing Director General (<i>Ex-officio</i>)]

Member Secretary
SHRI R. K. GUPTA
Joint Director (CED), BIS

Bituminous Flooring Wall Covering and Roofing Subcommittee, CED 5:5

In personal capacity (B-190, Sector 55, Noida-201301)	SHRI R. S. SHUKLA
Bharat Petroleum Corporation Ltd, Mumbai	SHRI P. C. SRIVASTAVA SHRI J. A. JANAJ (<i>Alternate</i>)
Building Materials and Technology Promotion Council, New Delhi	SHRI J. SENGUPTA
Central Building Research Institute (CSIR), Roorkee	SHRI M. ASLAM DR R. S. SRIVASTAVA (<i>Alternate</i>)
Central Road Research Institute (CSIR), New Delhi	HEAD (FLEXIBLE PAVEMENTS) SHRI SATENDER KUMAR (<i>Alternate</i>)
Coromandal Anti-Corrosive Ltd, Chennai	SHRI R. SRINIVASAN SHRI M. ANNAMALAI (<i>Alternate</i>)
Engineer-in-Chief's Branch, New Delhi	COL S. K. HAJELA SHRIMATI UPINDER KAUR (<i>Alternate</i>)
Engineer India Limited, New Delhi	SHRI J. K. BHAGCHANDANI SHRI S. DAS (<i>Alternate</i>)
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